

Industrial Ergonomics



Workers Compensation Fund



Ergonomics

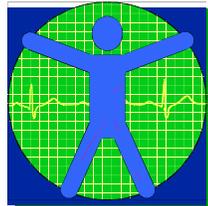
- The Science of Fitting the Task to the Worker
- The goal of an effective Ergonomics Program is to reduce the risk of employee injury and discomfort through better matching of the work station to the employee.



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Industrial Ergonomics

- Maintain or improve productivity
- Maintain or improve quality
- Lower productivity costs



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Industrial Ergonomics

- The Impact of Musculoskeletal Disorders (MSDs)
 - 34% of all lost work day injuries
 - 600,000 MSDs reported each year
 - 1/3 of workers' compensation costs
 - Total direct costs nearly \$50 billion
 - Can cause permanent disability



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Industrial Ergonomics

- The Impact of MSDs
 - Increased burden on health insurance costs
 - Increased absenteeism
 - Lower productivity
 - Increased training costs



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Industrial Ergonomics

- Benefits
 - Fewer employee injuries
 - Reduced workers compensation premiums
 - Reduced health insurance costs
 - Reduced absenteeism
 - Lower training/retraining costs



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Industrial Ergonomics

- **Benefits**

- Increased productivity
- Increased quality
- Less equipment damage
- Less down time
- Reduced OSHA involvement
- **HIGHER PROFITS!!!**



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Return of Ergonomics Rule??

<http://thehill.com/the-executive/business-groups-strategize-for-return-of-ergonomics-regulation-2008-09-11.html>

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Outline

- **Musculoskeletal Disorders (MSDs)**
 - Also sometimes known as Cumulative Trauma Disorders (CTDs)
- **Contributing Factors & Risks of Industrial Processes & Lifting/Manual Material Handling.**
- **Reducing the Risk Of Injury.**
- **Recognizing Ergonomic Hazards (Task Analyses).**
- **Information To Assist In Developing A Formal Ergonomics Program.**

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Musculoskeletal Disorders

- **Tendinitis**
- **Tenosynovitis**
- **Ganglionic cysts**
- **Epicondylitis**
- **Hand arm vibration syndrome**
- **Rotator cuff injury**



injury

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Musculoskeletal Disorders

- **Bursitis**
- **Muscle Strains**
- **De Quervain's disease**
 - Gamekeeper's thumb
- **Stenosing tenosynovitis crepitans**



Trigger finger

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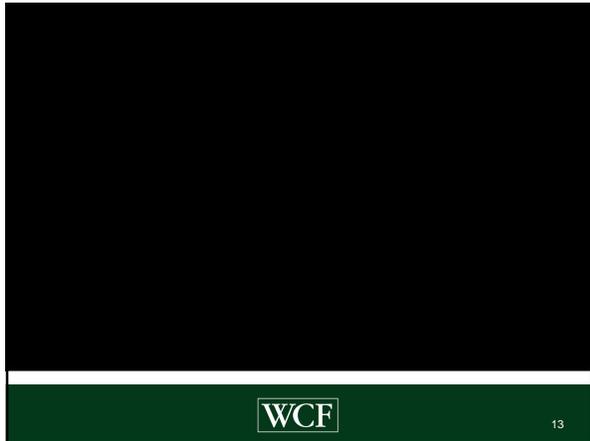
Other Ergonomic Injuries

- **"Slipped Disc" or disk protrusion**
- **Cervical disk syndrome**
- **Carpal tunnel syndrome**
- **Ulnar nerve entrapment**
- **Thoracic outlet syndrome**



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Preceding Videos can be downloaded at:
www.worksafebc.com

And viewed on Youtube at:
www.youtube.com/user/WorkSafeBC

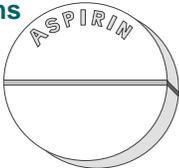
Direct Contact Trauma

- Bruises
- Lacerations
- Crushing
- Swelling of the legs and ankles



Discomforts

- Sore neck
- Sore shoulders and arms
- Backache
- Eye strain
- Headache



The Risks, Contributing Factors

- Musculoskeletal Disorders caused by
 - Force
 - Frequency
 - Posture
 - Fatigue
 - Temperature
 - Vibration



The Risks, Contributing Factors

- MSDs caused by
 - Other
 - Production quotas
 - Piece rate compensation
 - Health conditions
 - Employee morale



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Contributing Health Conditions

- Diabetes
- Obesity
- Menstrual cycle
- Pregnancy
- Rx medications
- Smoking
- Unhealthy lifestyle



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Other Contributing Factors

- Sports
 - Bowling
 - Mountain biking
 - Weight lifting
- Hobbies
 - Crocheting
 - Playing musical instrument
 - Surfing the Net



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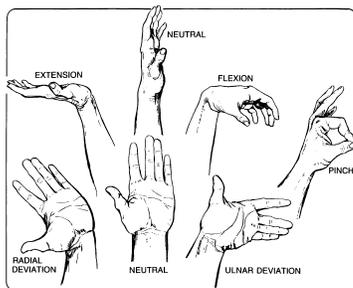
Adverse Posture

- Neck bent and head not balanced
- Spine bent at the waist in any plane
- Arms near shoulder level or above
- Elbows lifted away from torso
- Acute, obtuse forearm angle at elbow
- Deviated wrist postures
- Finger pinch grip



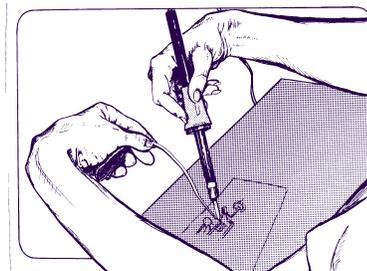
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Posture



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Posture & Force



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Posture & Force

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Pinch Grip

Power Grip

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Posture & Force

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Posture & Force Lifting Tasks

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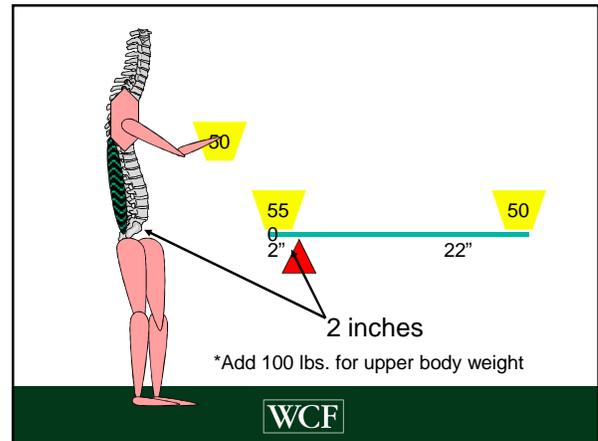
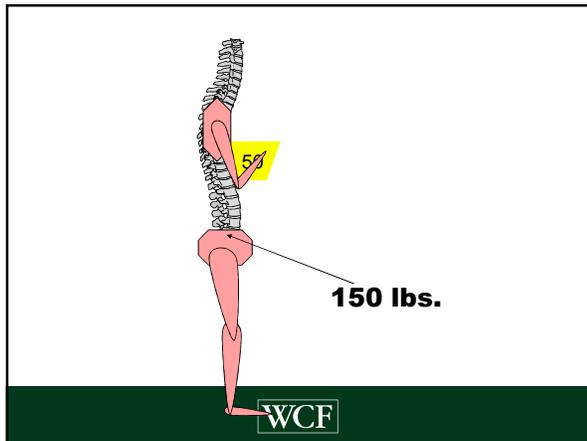
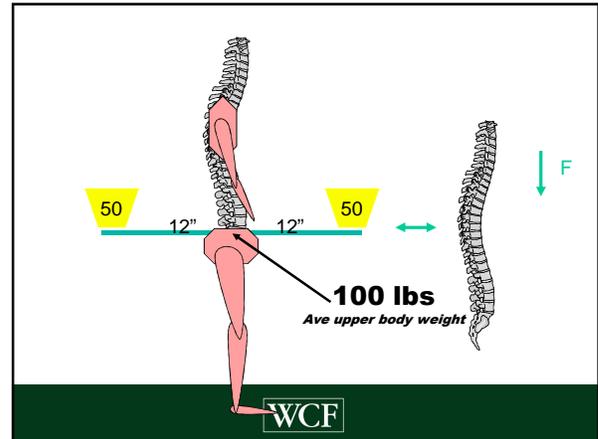
Kindergarten Physics

"All I ever needed to know I learned in kindergarten."

--Robert Fulghum



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Reducing the Risks

- Eliminate or minimize the factors contributing to MSD injuries.
- Eliminate or minimize the hazards equipment or furniture may have that can cause direct contact injuries.
- Implement an Ergonomics Program.

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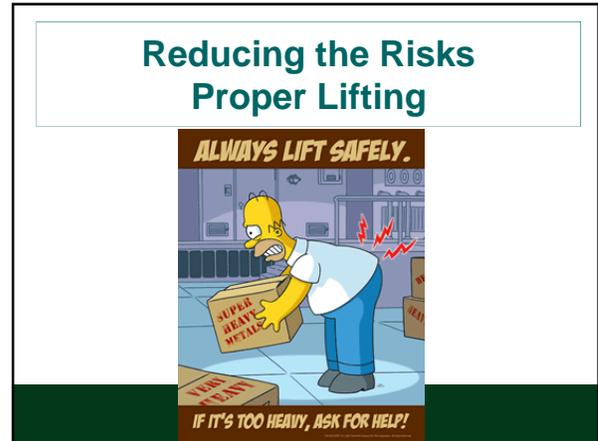
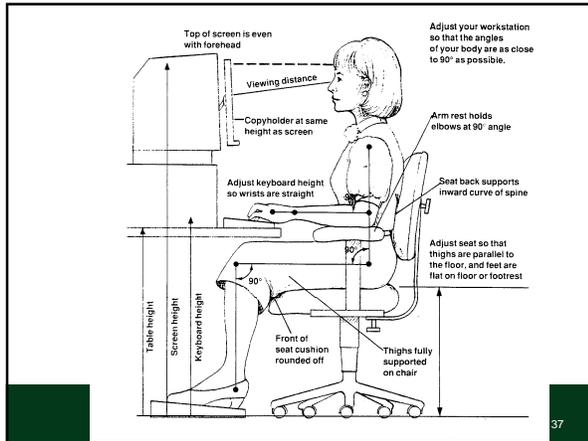
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Reducing the Risk Optimum Posture

- Head and neck centered on shoulders
- Upright spine
- Elbows at the sides of the torso
- Forearms near 90 degrees at elbow
- Work performed in front of the body at about waist height for standup work and elbow height for sit down work.
- Neutral wrist posture
- Power grip with fingers

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Reducing the Risks Proper Lifting

- **Stretch and Warm Up First**
- **Lock and Load**
- **Find the Best Position**
- **Hold the load as close to body as possible (shorten the lever arm)**
- **Avoid Twisting (torso, arm, legs, etc.)**
- **Plan Your Lift**
- **Use Lifting Aids Where Possible**

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Stretching Examples

Make sure you check with your doctor before doing these!!

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Stretching Examples

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Stretching Examples

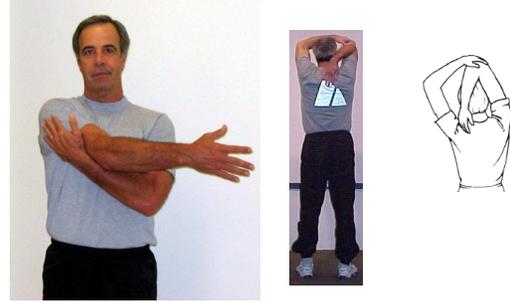
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Stretching Examples



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Stretching Examples



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Stretching Examples



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Lock and Load



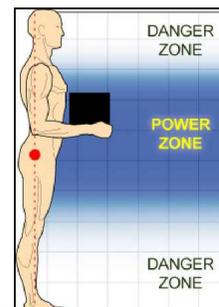
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Lock and Load

- Keep Back Straight with natural curvature in lumbar spine
- Lock (tighten) your abdominal muscles to provide support to your spine
- Lift the load while maintaining the tightened abdominals and straightened back with natural spine curvature.

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Find the Best Position



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DANGER ZONE

Avoid lifting above shoulder level

POWER ZONE

Avoid lifting below knee level.

DANGER ZONE

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Hold the Load As Close as Possible

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Avoid Twisting

The spine is surrounded by many muscles and ligaments which give it great strength.

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Plan Your Lift Use Lifting Aids Where Possible

AS SEEN ON TV

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Some Simple Ergonomic Tools

- See handouts:
 - Washington State Calculator for Lifting Operations
 - Hazard Zone Checklist
 - Caution Zone Checklist

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Task Analyses



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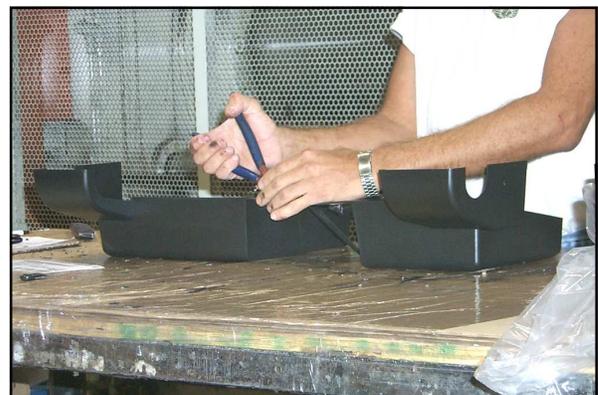
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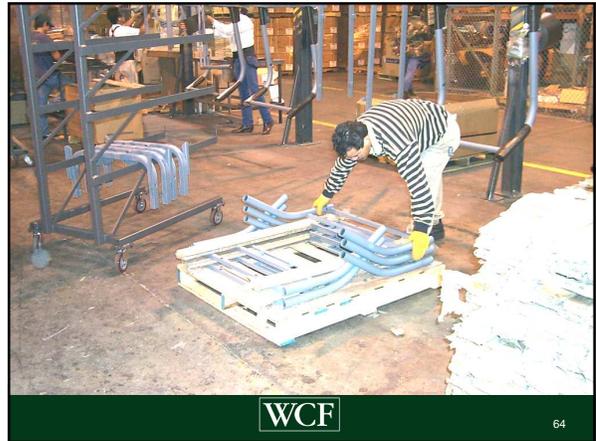
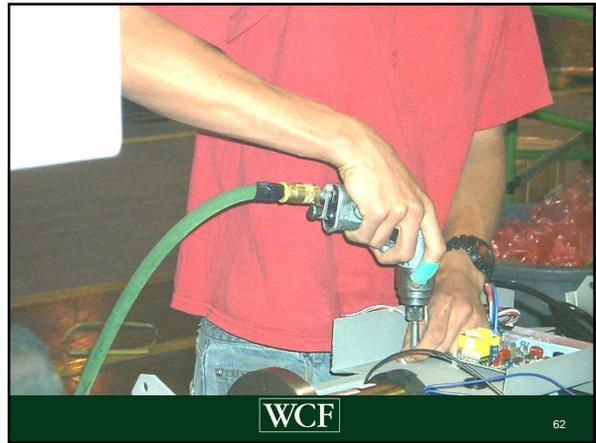
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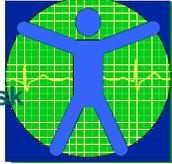
Developing a Workplace Ergonomics Program
Fitting the Workplace to the Worker

A graphic consisting of a blue stick figure standing next to a green grid. A yellow ECG line is overlaid on the grid. The entire graphic is enclosed in a blue square.

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Workplace Ergonomics Program

- Management commitment
- Employee participation
- Job or Worksite hazard analysis
- Controlling ergonomic risk
- Medical Management
- Training and Education
- Ongoing Program Evaluation



The previous video can be viewed or downloaded on the OSHA website at:

<http://www.osha.gov/SLTC/video/ergoprogramsthatwork/video.html>

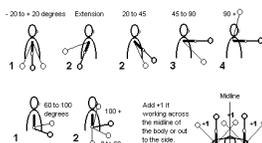
To view, click the appropriate link. To download, right click the appropriate link and choose "save link as."

Management Commitment

- The most important element of an ergonomics program (or any management program).
- WHY???

Job Hazard Analysis

- Review claims
- Review absenteeism
- Employee input
- Quantification tools
 - Job Safety Analysis



Controlling Ergonomic Risk

- Engineering controls
 - Facilities and Equipment
- Administrative controls
 - People



Engineering Controls

- **Modify workstation design**
 - Get employee input
- **Review work and parts flow**
- **Automation**
- **Tools that maintain optimum posture**
- **Tools to assist lifting and carrying**



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Engineering Controls

- **Minimal vibration tools**
- **Padding**
- **Control workplace temperature**
- **Maintain body heat to extremities**
- **Larger handles**



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Administrative Controls

- **Employee training in ergo risk factors**
- **Discuss the affect of outside activities**
- **Wellness programs**
- **Program stretching activities**
- **Exercise/work conditioning programs**



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Administrative Controls

- **Cross training**
- **Job rotation**
 - 2 hour sessions
 - dissimilar actions
- **Rest breaks**



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Medical Management

- **Early symptom evaluation**
 - Direct observation
 - Surveys
 - Open communication
 - Medical evaluation
 - Conservative treatment
 - Medical monitoring



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Medical Management

- **Symptomatic individuals moved to duties posing less risk**
 - Early symptoms
 - Post operative
- **Wellness programs**



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Training and Education

- Management commitment essential
- Alert employees to the hazards
- Discuss MSD symptoms
- Describe prevention methods



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Training and Education

- Employee responsibilities during modified duty
- Solicit employee feedback
- Reinforce requirements to follow program



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Ongoing Program Evaluation

- What is working?
- What is not working?
- What can be changed?
- Implement changes
- Re-evaluate



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Workplace Ergonomics Program

- Management commitment and employee participation
- Job hazard analysis
- Controlling ergonomic risk
- MSD Management
- Training and Education
- Program Evaluation



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Success with Ergonomics

- Blue Cross & Blue Shield of Rhode Island
 - Problem – Increasing lost workdays due to MSDs
 - Solution
 - Safety committee
 - Increased employee awareness



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Success with Ergonomics

- Blue Cross & Blue Shield of Rhode Island
 - Solution
 - Formal Ergonomics Program
 - Employee workstations assessed
 - Workstations changed
 - Employee training
 - Stretching exercises
 - Recordkeeping



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Success with Ergonomics

- **Blue Cross & Blue Shield of Rhode Island**
 - **Results**
 - Lost workdays decreased from 345 in 1999 to 104 in 2000
 - Workers compensation costs dropped from \$227,620 to \$26,010



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Internet Resources



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OSHA Web Site

<http://www.osha.gov/SLTC/ergonomics/index.html>



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NIOSH Web Site

<http://www.cdc.gov/niosh/topics/ergonomics/>



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University of South Florida

<http://personal.health.usf.edu/tbernard/ergotools/index.html>

Washington State

<http://www.lni.wa.gov/Safety/Topics/Ergonomics/ServicesResources/Tools/default.asp>



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More Ergonomic Resources

Cornell University

www.ergo.human.cornell.edu



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Ergoweb

www.ergoweb.com



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Thank You!

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